

Self-Regulation and Problem Solving Ability on Geography Basic Knowledge Materials Using the 7E-Learning Cycle Model

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Abstract-Geography is a subject that requires a lot of visualization as a way of understanding. The use of methods such as problem solving and self-regulation are very essential in geography subject. Applying problem solving along with self-regulation can be done by implementing 7E-learning cycle for the sake of maximizing the way students learn. Unfortunately, the ability of some students in problem solving is still low. To overcome these problems, 7E-learning cycle is applied where the students optimize the way they learn and develop their reasoning through the learning stages of elicit, engage, explore, explain, elaborate, evaluate, and extend. This research aims to describe the initial conditions of self-regulation and the ability to solve geographic problems in basic knowledge of geography, test the effectiveness of learning with the 7E-learning cycle model, and describe the self-regulation by solving geographic problems in basic geographic knowledge material after the implementation of the 7E-learning cycle. This research uses quantitative methods and class X MA NU Nurul Ulum as the subject of this research. The independent variable in this study is the learning model, while the dependent variable is the problem solving ability and self-regulation. The data was carried out using proportion test, t-test, paired difference test, and normalized gain. The conclusion of this study is the initial conditions of students' self-regulation do not have specific strategies in learning and the initial conditions of students' problem solving abilities are not familiar with high-level problem solving problems, learning with 7E-learning cycle is effective against self-regulation and problem-solving abilities, and after the implementation of the 7E learning cycle conditions the condition of self-regulation of students is accustomed to seeking help to support their learning and the problem solving ability of students can understand the problem to be more effective and re-examine the answer.

Keywords: *7E-learning cycle, problem solving ability, self-regulation*

I. INTRODUCTION

Today, the world of education in Indonesia is full of challenges due to policy changes by the government. Programs such as National Examination (UN) which is currently changing into computer-based technicality becomes a burden by schools to hold Computer-Based National Examination (UNBK). Viewed physiographically with a spatial approach, Indonesia is a country with a total of 17,000 islands indicating that to hold a Computer-Based National Examination (UNBK) will be difficult to carry out successfully. Based on a survey conducted by PISA said that the quality of Indonesian education in the fields of mathematics, science and literacy in 2018 has decreased since following the PISA assessment from 2000. This shows that the quality of education in Indonesia is still at a low level.

In this digital industry 4.0 era, character building education program is called a solution in improving the quality of education. The application of character building education program in Indonesia is more related towards learning about manners, urbane, and customs in accordance with the local wisdom of each regions. Geography learning material in high schools (SMA) includes spatial phenomena based on physical aspects and complex social aspects. One of the geography materials which is learned by students in class X of High School (SMA) is basic knowledge of geography. Basic knowledge on the subject of geography consists of basic concepts, approaches, principles and aspects of geography. Geography basic knowledge material is very important for students in learning geography because it will support students in understanding the materials from class X to class XII. Therefore, the teacher takes big part in preparing basic knowledge of geography to students so that they are able to understand the next material whether in class X, XI or class XII.

Education in Indonesia, which is currently using the Curriculum 2013 according to Daryanto (2014), the learning process is students centered, class learning is expected to be able to encourage students to become more active learners. While geography learning according to Suharini (2009), the teacher should be able to provide direction so that students are brave enough to express their opinions so they can create an effective, efficient, conducive, and controlled classroom atmosphere, which makes good interactions between students and the teacher or between other students. Based on observations at MA NU Nurul Ulum shows the results that geography learning is still teacher centered. Another fact found that most students in MA NU Nurul Ulum said that the subject matter of geography is memorization learning. It shows that the learning model used has not touched on the two-way learning aspects between teachers and students.

Based on the administrative location of MA NU Nurul Ulum, which is used as the object of research, is located in Jekulo District, the eastern end of Kudus Regency. MA NU Nurul Ulum is a school ruled under the Ministry of Religion which is equivalent to High Schools (SMA). The background of students at MA NU Nurul Ulum out of a total of 824 as many as 692 students are students who live in boarding schools or usually called *santri*. The background of the majority of students is *santri* shows that the activities of students are divided into two, the first one is morning to afternoon in the Madrasah Aliyah as a formal school and the second one is day to night following activities as students from the boarding school. Another problem arises is when students do not have school activities anymore in Madrasah Aliyah, but they are still obliged to the activities of the boarding house activities until the evening. So it is concluded that students at MA NU Nurul Ulum have difficulty in arranging geography subjects.

Self-regulation according to Kauffman (in usta & Bozpolat, 2014) defines it as a mean of students to control and carry out complex learning activities. The dimensions of self-regulation according to Zimmerman (in Schunk, Pintrich, and Meece, 2008) are self-efficacy and self-aim; use of strategy or time performance; time management; self-observation; self-assessment and self-reaction; manage the learning environment, and selectively seek help. The ability to plan learning strategies and targets to be achieved in learning is one of the characteristics of students who have self-regulation. Students who have self-regulation in learning are individuals who have knowledge and strategic goals and have the independence to direct their abilities effectively in learning (Peeverly, Brobst, Graham, Shaw, 2003). Based on the background conditions of MA NU

students Nurul Ulum, self-regulation is very appropriate and very important for students to have especially for students who live as *santri* in Islamic boarding schools. Due to the low problem solving of geography, students with self-regulation are expected to have the ability to solve problems in geography subject on basic knowledge of geography.

The principles in developing the 2013 curriculum emphasize the use of various sources. Based on the problem of the low problem solving abilities of students today, it is time to fix the learning process of geography, especially learning strategies and models. 7 E-learning cycle is one of the learning models that provides opportunities for students to optimize learning and develop the reasoning power of students. The 7E-learning cycle learning model according to Eisenkraft (2003) has stages, they are elicit, engage, explore, explain, elaborate, evaluate, and extend. Based on the description above, this study aims to (1) describe the initial conditions of self-regulation and the ability to solve geographic problems in basic knowledge of geography, (2) test the effectiveness of learning with the 7E-learning cycle model, and (3) describe the self-regulation by solving geographic problems in basic geographic knowledge material after the implementation of the 7E-learning cycle.

II. METHODS

This research uses quantitative methods with research subjects in class X MA NU Nurul Ulum. The analysis with quantitative methods is to determine the effectiveness of learning to see the extent of self-regulation with the ability to solve problems using the 7E-learning cycle model. The research technique was conducted in five meetings, it was conducted in the experimental class group (it is a group that obtained learning using the 7E-learning cycle) and the control group (it is a group that obtained learning using the lecture model). Then, the data collection is done by scale, test and documentation. In the beginning and the end of the research activity, the students were tested using pre-test and post-test exercises which consisted of problem solving ability and self-regulation scale. The independent variable in this study is the learning model, while the dependent variable is the problem solving ability and self-regulation. Data processing was carried out using proportion test, t-test, paired difference test, and normalized gain.

III. RESULTS AND DISCUSSION

Zimmerman (1989) defines self-regulation is a degree of metacognition, motivational and individual behavior in the learning process undertaken to achieve learning goals. In the beginning of this research, before using the 7E-learning cycle were associated with self-regulation in the experimental group of 36 students, only 6 students reached the high category, 23 students were in the moderate category and the rest were in the low category. The initial conditions of self-regulation, students are good in governing the learning environment indicator which is 73.3%, while the lowest indicator is the use of strategies only 58.9%. The distribution of the Self-regulation conditions for each indicators before the implementation of 7E-learning cycle is presented in TABLE 1. DISTRIBUTION OF EACH INDICATORS OF SELF-REGULATION BEFORE THE IMPLEMENTATION OF 7E-LEARNING CYCLE.

Indicator	Percentage
Self-Efficacy and Goals	61,1%
The Use of Strategy	58,9%
Time Management	64,9%
Observation, Evaluation, & Self-Reaction	62,3%
Organize Learning Environment	73,3%
Seek Help Selectively	62%

Students are good in the indicator to regulate the learning environment, because they have been trained to prepare resources and reading material in managing all learning activities independently through their Islamic Boarding House environment. Organizing the learning environment according to Sari (2014) is the development of self-regulation abilities and attitudes that lead to good self-regulation which can be supported by various factors around students such as teachers, parents, the environment, and the basic abilities of the students themselves. While the weakness of self-regulation for students lies in the use of strategies indicator, it is the delivery of learning strategies by teachers with conventional model of lecturing so students tend to be less active and difficult to accept basic knowledge of geography that requires a lot of learning material.

In the beginning, students are not yet accustomed to solve problems using problem solving. They are not yet accustomed to the way to answer as well, students are not accustomed to using the stages of problem solving from Suherman. It is seen from many students who answer questions in a direct way without using the stages. It affects students' learning outcomes of geography daily test scores on basic

geographic knowledge material that reaches 75%, which means it is less than the minimal standard score. This can be happen because of the lack in mastering the content of questions about basic knowledge of geography that requires a visualization understanding, such as questions about the concept of morphology.

The effectiveness of learning using 7-cycle learning is shown in (1) students' problem solving ability in the experimental group achieved classical completeness which means students who scored more than equal to 75 achieved more than equal to 75%, after testing the proportion of the right party in the post-test of problem solving ability (2) students' problem-solving ability in geography who obtained learning using 7E-learning cycle is better than conventional model learning, after they were tested using one party's t-test on the post-test scores of the experimental and control group's problem-solving abilities, it is obtained; (3) students' self-regulation who obtained learning using the 7E-learning cycle is better than conventional model learning, after they were tested using one-party t-test on the final score of the experimental and control group self-regulation scale; (4) students' problem solving ability in learning after using 7E-learning cycle is better than before using 7E-learning cycle, after a paired difference test is tested on the pre-test and post-test of the problem solving abilities of the experimental group, then they got a score of 0.75 after they were tested using normalized gain test, which means an increase in problem solving ability is in the high category; (5) students' self-regulation in learning after using 7E-learning cycle is better than learning self-regulation before using 7E-learning cycle, after a paired difference test is tested on the initial and the final score of the self-regulation scale of the experimental group, then they got a score of 0.32 after they were tested using the normalized gain test, which means an increase in self-regulation is in the moderate category.

In the final condition of self-regulation, students who reach the high category increase to 7 students, the low category decreases to 4 students, and the rest are medium categories. If we see from each indicators of self-regulation, all indicators have increased. The highest increase is the use of strategies indicator which rose by 26%. The final condition of self-regulation of students are good in selective seeking help indicator which reached 86.2%, while the lowest is in indicator of observation, assessment and self-reaction which is 77.1%. The distribution of Self-regulation conditions for each indicators after the implementation of 7E-learning cycle is presented in

TABLE 2. THE CONDITIONS OF SELF-REGULATION INDICATORS AFTER THE IMPLEMENTATION OF 7E-LEARNING CYCLE.

Indicator	Percentage
Self-Efficacy and Goals	83,2%
The Use of Strategy	84,7%
Time Management	79,6%
Observation, Evaluation, & Self-Reaction	77,1%
Organize Learning Environment	80,2%
Seek Help Selectively	86,2%

After using 7E-Learning Cycle learning model, there are changes in students that affect the level of Self-Regulation in Geography subject. This change is due to the readiness of students who have measurable learning goals that affect learning outcomes. From the diagram above shows that if students have difficulty in the process of learning and understanding the material, they have the initiative to ask friends who know better and maximize learning resources such as by visiting the library. According to Latipah (2010) To implement learning based on self-regulation in schools, this is done by making learning based on self-regulation as a strategy. One of them is by instilling the importance of asking for help (help seeking) if there is something that is not understood. Asking for help (help seeking) can be done to peer friends, teachers, or other adults who are considered capable, and use internet services if needed. The positive impact of the results of using 7E-Learning Cycle model is a significant increase in the use of strategies to receive the lesson, such as specific strategies in learning to improve the understanding of the material. This is proven by the opinions of Reni, Y.M., Kuswandi, D., & Sihkabuden (2017) that there is an interaction between learning strategies with self-regulated learning on learning outcomes.

In time management there is an increase after using the 7E learning cycle which is that previously students did not provide specific time for learning to change making additional time. According to Ulum (2016) self-regulation is effective to reduce the level of academic procrastination (delaying assignments). This means that the level of academic procrastination of students given a self-regulated learning strategy has decreased significantly compared to the control group who were not given a self-regulated learning strategy. Meanwhile according to Zimmerman (2011) and (Harahap, Neviyarni, & Dahamis: 2018) There is a significant relationship between self efficacy and self regulated learning. This means that if self-efficacy is improved, then self-regulated learning will increase too, and vice versa. During the learning activities with

the 7E learning cycle the responses of the students were very enthusiastic as evidenced when the discussion dared to express opinions without being instructed by the teacher. This shows that students begin to be comfortable with the learning environment at school. In regulating the learning environment according to Sari (2014) the development of the ability of self regulation and attitudes that lead to good self-regulation can be supported by various factors around students such as teachers, parents, the environment, and the basic abilities of the students themselves. If the learning environment is conducive and students are comfortable with the way the material is delivered by the teacher then it will further increase the understanding of the material and encourage an increase in grades. Dami and Parikaes (2018) Self-regulation gives confidence to students that what they are doing now is a process to achieve the desired goals / vision and social support of parents influences self-regulation.

Based on the analysis of the results of interviews, students' problem-solving abilities after the implementation of learning 7E-Learning Cycle are increasing. The improvements based on problem solving indicator are: (1) Understanding the problem; students write what they understood and asked from the problem of basic geographic knowledge appropriately, (2) Planning a strategy; students can write a complete and concrete problem-solving plan related to basic geographic knowledge material, (3) Implement the strategy; students solve the problems based on a plan that has been prepared, (4) Re-check; students re-examine the answers that have been done.

IV. CONCLUSION

Based on the results of the study, it can be concluded that (1) The initial conditions of students' selfregulation do not have specific strategies in learning and the initial conditions of problem solving ability students are not familiar with high-level problem solving problems, (2) learning the 7E-learning cycle is effective against selfregulation and problem-solving skills, and (3) self-regulation after the implementation of the 7Earning cycle students are accustomed to seeking help to support their learning and the ability to solve learning problems with 7Elearning cycle of students can understand the problem to be more effective and re-examine to the answer by re-reading the problem then examine each step of solving the problem

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